Houston Department of Health and Human Services

HURRICANES

FACT SHEET

Hurricane hazards come in many forms: storm surge, high winds, tornadoes, and flooding. This means it is important for your family to have a plan that includes all of these hazards. Look carefully at the **safety actions** associated with each type of hurricane hazard and prepare your family disaster plan accordingly. But remember - this is only a guide. The first and most important thing anyone should do when facing a hurricane threat is to use common sense.

What are the different levels of weather disturbances?

These are terms used to describe the progressive levels of organized disturbed weather in the tropics that are of less than hurricane status and can progress into hurricanes.

- **Tropical Disturbance**
  An organized mass of thunderstorms that originates in the tropics. It has a slight cyclonic circulation and winds less than **23 mph,** and maintains its identity for 24 hours or more.

- **Tropical Depression**
  An organized system of clouds and thunderstorms with a defined surface circulation and a clearly defined low pressure area with a closed circulation. Its highest wind speed is **38 mph.** Tropical depressions are numbered.

- **Tropical Storm (or Cyclone)**
  A severe storm that develops offshore over tropical seas with less than hurricane force winds but with the ability to develop into a hurricane. It is well-defined by rotating circulation. The maximum sustained surface wind speed ranges from **39 mph** to **73 mph**. When a tropical depression becomes a tropical storm, it gets a name.

- **Hurricane**
  When a tropical storm's winds equal or exceed **74 mph,** it is called a hurricane (in the Atlantic, eastern and central Pacific Oceans, and Gulf of Mexico). Hurricanes are further designated by categories on the Saffir-Simpson scale. Hurricanes in categories 3, 4, 5 are known as "major hurricanes" or "intense hurricanes".

The Saffir-Simpson Hurricane Scale

The Saffir-Simpson Hurricane Scale is a 1-5 rating based on the hurricane's present intensity. This is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale, as storm surge values are highly dependent on the slope of the continental shelf and the shape of the coastline in the landfall region. Note that all winds are using the U.S. 1-minute average.

- **Category One Hurricane:**
  Winds 74-95 mph (64-82 knots or 119-153 km/hr). Storm surge generally 4-5 feet above normal. No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Some damage to poorly constructed signs. Also, some coastal road flooding and minor pier damage. Hurricane Lili of 2002 made landfall on the Louisiana coast as a Category One hurricane. Hurricane Gaston of 2004 was a Category One hurricane that made landfall along the central South Carolina coast.

- **Category Two Hurricane:**
  Winds 96-110 mph (83-95 knots or 154-177 km/hr). Storm surge generally 6-8 feet above normal. Some roofing material, door, and window damage of buildings. Considerable damage to shrubbery and trees with some trees blown down. Considerable damage to mobile homes, poorly constructed signs, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of the hurricane center. Small craft in unprotected anchorages break moorings. Hurricane Frances of 2004 made landfall over the southern end of Hutchinson Island, Florida, as a Category Two hurricane. Hurricane Isabel of 2003 made landfall near Drum Inlet on the Outer Banks of North Carolina as a Category 2 hurricane.

- **Category Three Hurricane:**
  Winds 111-130 mph (96-113 knots or 178-209 km/hr). Storm surge generally 9-12 feet above normal. Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Damage to shrubbery and trees with foliage blown off trees and large trees blown down. Mobile homes and poorly constructed signs are destroyed. Low-lying escape routes are cut off by rising water 3-5 hours before arrival of the center of the hurricane. Flooding near the coast destroys smaller structures with larger structures damaged by battering from floating debris. Terrain continuously lower than 5 feet above mean sea level may be flooded inland 8 miles (13 km) or more. Evacuation of low-lying residences within several blocks of the shoreline may be required. Hurricanes

Jeanne and Ivan of 2004 were Category Three hurricanes when they made landfall in Florida and in Alabama, respectively.

- **Category Four Hurricane:**
  Winds 131-155 mph (114-135 knots or 210-249 km/hr). Storm surge generally 13-18 feet above normal. More extensive curtainwall failures with some complete roof structure failures on small residences. Shrubs, trees, and all signs are blown down. Complete destruction of mobile homes. Extensive damage to doors and windows. Low-lying escape routes may be cut off by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of structures near the shore. Terrain lower than 10 feet above sea level may be flooded, requiring massive evacuation of residential areas as far inland as 6 miles (10 km). Hurricane Charley of 2004 was a Category Four hurricane made landfall in Charlotte County, Florida, with winds of 150 mph. Hurricane Dennis of 2005 struck the island of Cuba as a Category Four hurricane.

- **Category Five Hurricane:**
  Winds greater than 155 mph (135 knots or 249 km/hr). Storm surge generally greater than 18 feet above normal. Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. All shrubs, trees, and signs blown down. Complete destruction of mobile homes. Severe and extensive window and door damage. Low-lying escape routes are cut off by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of all structures located less than 15 feet above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5-10 miles (8-16 km) of the shoreline may be required. Only 3 Category Five Hurricanes have made landfall in the United States since records began: The Labor Day Hurricane of 1935, Hurricane Camille (1969), and Hurricane Andrew in August, 1992. The 1935 Labor Day Hurricane struck the Florida Keys with a minimum pressure of 892 mb--the lowest pressure ever observed in the United States. Hurricane Camille struck the Mississippi Gulf Coast, causing a 25-foot storm surge, which inundated Pass Christian. Hurricane Andrew of 1992 made landfall over southern Miami-Dade County, Florida, causing 26.5 billion dollars in losses--the costliest hurricane on record. In addition, Hurricane Gilbert of 1988 was a Category Five hurricane at peak intensity and is the strongest Atlantic tropical cyclone on record with a minimum pressure of 888 mb.

What are some advisory terms I need to know?

- **Tropical Storm Watch:**
  An announcement that a tropical storm poses or tropical storm conditions pose a threat to coastal areas, generally within 36 hours. A tropical storm watch should normally not be issued if the system is forecast to attain hurricane strength.

- **Tropical Storm Warning:**
  A warning for tropical storm conditions, including sustained winds within the range of 34 to 63 knots (**39 to 73 mph** or 63 to 118 kph), that are expected in a specified coastal area within 24 hours or less.

- **Hurricane Watch:**
  An announcement of specific coastal areas to which a hurricane or an incipient hurricane condition poses a possible threat, generally within 36 hours.

- **Hurricane Warning:**
  A warning that sustained winds 64 knots (**74 mph** or 119 kph) or higher associated with a hurricane are expected in a specified coastal area in 24 hours or less. A hurricane warning can remain in effect when dangerously high water or a combination of dangerously high water and exceptionally high waves continue, even though winds may be less than hurricane force.

- **Storm Surge:**
  An abnormal rise in sea level accompanying a hurricane or other intense storm, and whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the cyclone. Storm surge is usually estimated by subtracting the normal or astronomic high tide from the observed storm tide.

- **Tornado Watch**
  Conditions are conducive to the development of tornadoes in and close to the watch area.

- **Tornado Warning**
  A tornado has actually been sighted by spotters or indicated on radar and is occurring or imminent in the warning area.

Key facts about hurricane readiness

What should I do to prepare for a hurricane?

Before a hurricane forms:
If you live in a hurricane-prone area, there are steps you should take to prepare yourself prior to hurricane season, which begins June 1 and ends November 30 every year.

- Learn about your community's emergency plans, warning signals, evacuation routes, and locations of emergency shelters. You should learn whether you are in a mandatory evacuation zone and what the expectations will be for evacuation. View the evacuation zone map at http://www.hcoem.org/images/Evacuation_Zone_Map.gif. The affected zip codes are:

77002	77023	77507	77057	77565	77502
77003	77024	77520	77058	77571	77503
77004	77026	77521	77059	77573	77504
77006	77027	77530	77061	77581	77505
77007	77028	77532	77062	77586	77506
77008	77029	77536	77075	77587	77021
77009	77030	77546	77078	77017	77598
77010	77033	77547	77087	77019	77056
77011	77034	77562	77089	77020	77048
77012	77044	77013	77015	77054	77049

In some cases the entire zip code does not fall within the zone. Please consider that some of these zip codes are only partially affected by the storm surge evacuation zones.

- Identify potential home hazards and know how to secure or protect them before the hurricane strikes.
- Be prepared to turn off electrical power when there is standing water, fallen power lines, or before you evacuate.
- Turn off gas and water supplies before you evacuate.
- Secure structurally unstable building materials.
- Buy a fire extinguisher and make sure your family knows where to find it and how to use it.
- Locate and secure your important papers, such as insurance policies, wills, licenses, stocks, etc. If you evacuate, take a copy with you, secured in a waterproof plastic bag.
- Post emergency phone numbers at every phone.
- Identify a family member or friend who lives outside the storm area and who can be used as a contact for all family members in case you

get separated. Make sure every family member has this phone number.
- Inform local authorities about any special needs, i.e., elderly or bedridden people, or anyone with a disability by registering at www.houstontx.gov/oem/Registration 2006.pdf or calling 2-1-1.
- Make plans to ensure your pets' safety. For more information, see the website for the Humane Society of the United States at http://www.hsus.org/hsus_field/hsus_disaster_center/.

What emergency supplies will I need?

You should stock your home with supplies that may be needed during the emergency period. At a minimum, these supplies should include:

- Several clean containers for water, large enough for a 3-5 day supply of water (about five gallons for each person)
- A 3-5 day supply of non-perishable food
- Manual can opener
- A first aid kit and manual
- A battery-powered radio, flashlights, and extra batteries
- Sleeping bags or extra blankets
- Water-purifying supplies, such as chlorine or iodine tablets or unscented, ordinary household chlorine bleach (see "Purifying Household Water") for instructions on how to make your drinking water safe
- Prescription medicines and special medical needs
- Baby food and/or prepared formula, diapers, and other baby supplies
- Disposable cleaning cloths, such as "baby wipes" for the whole family to use in case bathing facilities are not available
- Personal hygiene supplies, such as soap, toothpaste, sanitary napkins, etc.
- An emergency kit for your car with food, flares, booster cables, maps, tools, a first aid kit, fire extinguisher, sleeping bags, etc.

For more information on creating a Disaster Kit, visit **READYAmerica** at http://www.ready.gov/america/index.html.

What if a hurricane has developed and is headed my way?

If you are under a hurricane watch or warning, here are some basic steps to take to prepare for the storm:

- Expect the need to evacuate and prepare for it. Be sure you know whether you are in a mandatory evacuation zone (see above).
- When a hurricane watch is issued, you should:
  - Fill your automobile's gas tank.
  - If no vehicle is available, make arrangements with friends or family for transportation.
  - Fill your clean water containers.
  - Review your emergency plans and supplies, checking to see if any items are missing.
  - Tune in to the radio or television for weather updates.
  - Listen for disaster sirens and warning signals.
  - Prepare an emergency kit for your car with food, flares, booster cables, maps, tools, a first aid kit, fire extinguisher, sleeping bags, etc.
  - Secure any items outside which may damage property in a storm, such as bicycles, grills, propane tanks, etc.
  - Cover windows and doors with plywood or boards or place large strips of masking tape or adhesive tape on the windows to reduce the risk of breakage and flying glass.
  - Put livestock and family pets in a safe area. Due to food and sanitation requirements, many emergency shelters cannot accept animals, although this policy is undergoing some changes. However, you should have alternate plans available, just in case.
  - Place vehicles under cover, if at all possible.
  - Fill sinks and bathtubs with water as an extra supply for washing.
  - Adjust the thermostat on refrigerators and freezers to the coolest possible temperature.

What if I am ordered to evacuate?

Because of the destructive power of a hurricane, you should never ignore an evacuation order. Authorities will be most likely to direct you to leave if you are in a low-lying area, or within the greatest potential path of the storm. Be aware that most shelters and some hotels do not accept pets. If a hurricane warning is issued for your area and you choose to evacuate, or if you are directed by authorities to evacuate the area:

- Take only essential items with you.
- If you have time, turn off the gas, electricity, and water.
- Disconnect appliances to reduce the likelihood of electrical shock when power is restored.
- Make sure your automobile's emergency kit is ready.

- Follow the designated evacuation routes—others may be blocked—and expect heavy traffic.

What if I am ordered NOT to evacuate?

The great majority of injuries during a hurricane are cuts caused by flying glass or other debris. Other injuries include puncture wounds resulting from exposed nails, metal, or glass, and bone fractures. To get through the storm in the safest possible manner:

- Monitor the radio or television for weather conditions, if possible.
- Stay indoors until the authorities declare the storm is over.
- Do **not** go outside, even if the weather appears to have calmed—the calm "eye" of the storm can pass quickly, leaving you outside when strong winds resume.
- Stay away from all windows and exterior doors, seeking shelter in an interior room or basement.
- Bathtubs can provide some shelter if you cover yourself with plywood or other materials.
- Prepare to evacuate to a shelter or to a neighbor's home if your home is damaged, or if you are instructed to do so by emergency personnel.

What should I do when returning home after a hurricane?

Serious disease outbreaks have not occurred in hurricane-affected areas, but you should still be careful of getting sick or hurt.

- Wear waterproof boots and gloves to avoid floodwater touching your skin.
- Wash your hands often with soap and clean water, or use a hand-cleaning gel with alcohol in it.
- Avoid tetanus and other infections by getting medical attention for a dirty cut or deep puncture wound.
- Do not enter a building if you smell gas. Call 911. Do not light a match or turn on lights.
- Do not enter a building if there is any question about the structural soundness.
- Check the electrical system unless you are wet, standing in water, or unsure of your safety. If possible, turn off the electricity at the main fuse box or circuit breaker. If the situation is unsafe, leave the building and call for help. Do not turn on the lights until you are sure they’re safe to use. You may want to have an electrician inspect your wiring.
- Do not touch fallen electrical wires. They may be live and could hurt or kill you.
- If appliances are wet, turn off the electricity at the main fuse box or circuit breaker. Then, unplug appliances and let them dry out. Have

appliances checked by a professional before using them again. Also, have the electrical system checked by an electrician before turning the power back on.

- If water or sewer pipes are damaged, turn off the main water valve. Check with local authorities before using any water, as the water could be contaminated. Pump out wells and have the water tested by authorities before drinking. Do not flush toilets until you know that sewage lines are intact.
  - If a "boil water" advisory is in effect, do not drink tap water or use it to brush your teeth unless water has come to a rolling boil for at least 1 minute or is treated with unscented household chlorine bleach (add ¼ teaspoon bleach to 1 gallon of cloudy water; ⅛ teaspoon bleach to 1 gallon of clear water). For more information, See "Purifying Household Water."
- Throw out all food and other supplies that you suspect may have become contaminated or come in to contact with floodwater. Do not eat food that smells bad or looks bad. When in doubt, throw food out.
- If you have a basement and it has flooded, pump it out gradually (about one third of the water per day) to avoid damage. The walls may collapse and the floor may buckle if the basement is pumped out while the surrounding ground is still waterlogged.
- Clean up household chemical spills. Disinfect items that may have been contaminated by raw sewage, bacteria, or chemicals. Also clean salvageable items.
- Do not use generators, pressure washers, charcoal grills, camp stoves, or other fuel-burning devices indoors or in enclosed or partially enclosed areas such as garages, even with doors or windows open. Do not put these devices outside near an open door, window, or air vent. You could be poisoned or killed by carbon monoxide, an odorless, colorless gas from burning fuel such as gasoline, charcoal, or propane.
- Call your insurance agent. Be sure to take pictures of damages and keep good records of repair and cleaning costs.

How can I clean my home and stop mold?

- Take out items that have soaked up water and that cannot be cleaned and dried.
- Fix water leaks. Use fans and dehumidifiers and open doors and windows to remove moisture.
- To remove mold, mix 1 cup of bleach in 1 gallon of water, wash the item with the bleach mixture, scrub rough surfaces with a stiff brush, rinse the item with clean water, then dry it or leave it to dry.
- Check and clean heating, ventilating, and air-conditioning systems before use.

- To clean hard surfaces that do not soak up water and that may have been in contact with floodwater, first wash with soap and clean water. Next disinfect with a mixture of 1 cup of bleach in 5 gallons of water. Then allow to air dry.
- Wear rubber boots, rubber gloves, and goggles when cleaning with bleach. Open windows and doors to get fresh air. Never mix bleach and ammonia. The fumes from the mixture could kill you.

What are some other things I can do to stay safe?

- **Avoid contact with animals and insects**
  - Reduce mosquito bites. Consider avoiding outdoor activities during the evening and early morning, which are peak biting times for many mosquitoes. Use an insect repellent with DEET or Picaridin.
  - Stay away from wild or stray animals. Stray dogs may be hurt or afraid and may bite. Call local authorities at 3-1-1 to handle animals.
  - Get rid of dead animals according to local guidelines.

- **Drive safely**
  - Traffic lights may be out. Stop and look both ways at all intersections. Drive slowly and keep space between you and other vehicles. Watch out for trash on the road.
  - Wear your seatbelt.
  - Do not drive if you have been drinking.

How can I get help after the hurricane?

Direct assistance to individuals and families may come from any number of organizations, including:

- American Red Cross
- Salvation Army
- Other volunteer organizations

These organizations provide food, shelter, supplies and assist in clean-up efforts.

In the most severe disasters, the federal government is also called in to help individuals and families with temporary housing, counseling (for post-disaster trauma), low-interest loans and grants, and other assistance. The federal government also has programs that help small businesses and farmers. Most federal assistance becomes available when the President of the United States declares a "Major Disaster" for the affected area at the request of a state governor. **FEMA** will provide information through the media and community outreach about federal assistance and how to apply.